

Application Note for Using the Operator Station HE500TIU050 / 10X / 11X / 20X / 3XX with the Toshiba EX, M and T Series PLC's

1.0. Protocol File Name

HE500TIU050 = EX100_R?.0xx
HE500TIU1xx = EX100_R?.1xx
HE500TIU2xx = EX100_R?.2xx
HE500TIU3xx = EX100_R?.3xx
(The "?" = the TIU firmware revision)

2.0. Configuring the Operator Station

To verify the Automated Equipment type the Operator Station is setup for, watch the screen of the Operator Station on power up. The first screen message details the setup of the Operator Station. To configure the Operator Station for particular Automated Equipment, select the Automated Equipment in the Communication Settings from the Configure menu in **CBREEZE** software. Select the appropriate Manufacturer and the appropriate Remote Equipment Model. Then from the File menu select Update Protocol, the appropriate file name will appear in the file name field. The programmer may need to point to the correct folder name/location. If further information is required see the manual or **CBREEZE** help on update/change protocol.

3.0. Protocol Revisions

Version 1.08 of the supports the new features of the T series namely: -

- T. Timer Devices
- C. Counter Devices
- S. Special Device
- SW Special Register

4.0. Serial Port Configuration

The default settings of 9600 baud, eight data bits and odd parity with no handshaking are forced in the terminal.

5.0. Node Number

The PLC Node address is set in the PLC software.

On a new T series device the Node address appears to default to 0.

When a program is downloaded to the PLC the Node address may change to another value between 1 and 32. If the node address has been set to 0 within the TIU configurator, make sure the TIU software Node address is changed to the same

value as that in the PLC programme after a download, otherwise communication between the TIU and the PLC will be lost.

5.1. Networking

The T1S and T2E PLC's supports Networking.

If more than 1 PLC is being used on a network, RS485 mode must be selected using "Communication Mode" and the "Network Mode Enable" box needs to be enabled. PLC Node addresses are then set in the "Embedded Data" section in each page of the configuration.

If more than one Toshiba series device is connected on a network it is important to make sure that they all have different addresses (set via the Toshiba software) and that all the Node addresses set within the TIU configuration, correspond to the correct PLC's.

The parameters selected will then be transferred to the TIU during a programme download.

For further details of the above devices refer to the "USERS MANUAL – Basic Hardware and Functions" for the relevant PROSEC Txx PLC

6.0. Parameter Specification

The register addressing ranges selectable from within the TIU configurator have been chosen to allow the widest values of a particular family. Always check with the manufacture's data to ensure selected register addresses are available. A chart showing the register types and ranges is included in this documentation.

Also note that some of the registers are READ ONLY. Trying to write to read only registers could cause unpredictable results and should be avoided.

Word Types

Reg Name	Type	Access
XW	External input registers	Read
YW	External output registers.	Read
RW	Auxiliary relay registers	Read & Write
SW	Special registers	Read
T	Timer registers	Read
C	Counter registers	Read
D	Data registers	Read & Write

Table 1. Word Type Register Accesses

Bit Types

Reg Name	Type	Access
X	External input devices	Read
Y	External output devices	Read
R	Auxiliary relay devices.	Read & Write
S	Special devices	Read
T	Timer Devices	Read
C	Counter Devices.	Read

Table 1. Word Type Register Accesses

Bit types may be selected to be displayed as “Bit Status” types within the TIU configurator. The appropriate bit is selected in the “Identifier” box, and the required message pair e.g. ON or OFF, FAST or SLOW etc. can be selected from the “Select Token Pair” box.

6.1. Register Ranges

Note: The following data is for guidance purposes only and must be confirmed by manufacturers own data on the relevant products. R & S device types are limited by the protocol to 63E not 63F as stated in the PLC Documentation. The Address is entered in the “Identifier box” as a combination of decimal and hexadecimal numbers, e.g. 31F or 15A or 270. The last digit represents the bit number within the word.

Word register ranges

Type	Dir.	T1	T1S	T2E
XW	R	00-31	00-31	00-63
YW	R	02-31	02-31	00-63
RW	R/W	00-63	00-255	000-255
SW	R	00-63	00-63	000-255
T	R	00-63	00-63	000-255
C	R	00-63	00-63	000-255
D	R/W	0-1023	0-4095	0-4095

Table 3. Word Register Ranges

Bit register ranges

Type	Dir.	T1	T1S	T2E
X	R	00-31F	00-31F	00-63F
Y	R	00-31F	00-31F	00-63F
R	R/W	00-63E	00-63E	000-127F
S	R	00-63E	00-63E	000-255F
T.	R	00-63	00-63	000-255
C.	R	00-63	00-63	000-255

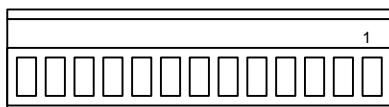
Table 4. Bit Register Ranges

6.2. Connections

The TIU can be connected to the Toshiba T series via the programming port or via the extra serial port available on the T1S or the extra communication card for the T2E with RS232 or RS485 connectivity.

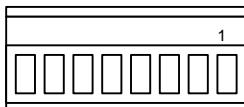
7.0. Connection details to Toshiba T Series PLC's

13-Pin Screw Terminal Block

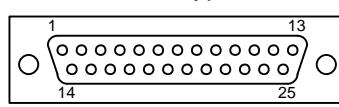


TIU100, TIU110

8-Pin Screw Terminal

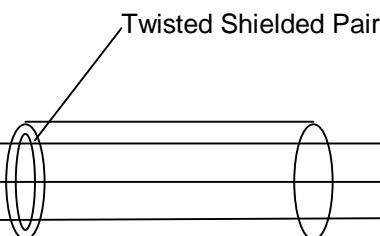
TIU050, 101, 102, 103,
111, 112, 113, 201,
202, 203

25-Pin D-Type Male

TIU300, 301, 302, 303, 304,
310, 311, 312, 313, 314,
320, 321, 322, 323, 324

TIU Type Signal Name	13-Pin	8-Pin	25-Pin
+5V	1		
TX 485/422+	2	1	12
TX 485/422-	3	2	13
RX 485/422+	4	3	24
RX 485/422-	5	4	25
TX RS232	6	5	2
Signal GND	7	6	7
RX RS232	8	7	3
Frame Gnd	13	8	1
RTS RS232	-	-	4
CTS RS232	-	-	5
RTS 485/422+	-	-	14
RTS 485/422-	-	-	17
CTS 485/422-	-	-	18
CTS 485/422+	-	-	19

RS232 Connection

Toshiba
T1
8-Pin
Mini-Din

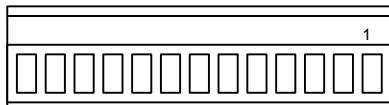
5V DC	1
GND	2
5V DC	3
RTS	4
0V	5
TX	6
CTS	7
RX	8

Do not connect to unlisted pins.

Recommended cable : Belden 9503, twisted multipair, screened.
Connect the screens together at the shield / Earth pin of the PLC

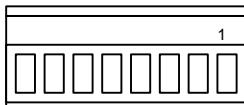
7.1. Connection details to Toshiba T2 Series PLC's

13-Pin Screw Terminal Block

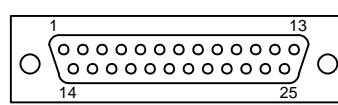


TIU100, TIU110

8-Pin Screw Terminal

TIU050, 101, 102, 103,
111, 112, 113, 201,
202, 203

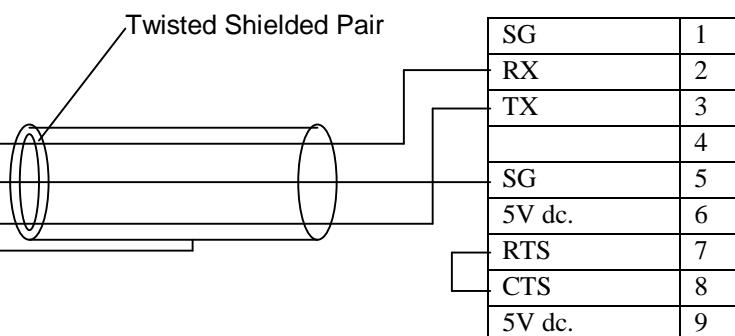
25-Pin D-Type Male

TIU300, 301, 302, 303, 304,
310, 311, 312, 313, 314,
320, 321, 322, 323, 324

TIU Type Signal Name	13-Pin	8-Pin	25-Pin
+5V	1		
TX 485/422+	2	1	12
TX 485/422-	3	2	13
RX 485/422+	4	3	24
RX 485/422-	5	4	25
TX RS232	6	5	2
Signal GND	7	6	7
RX RS232	8	7	3
Frame Gnd	13	8	1
RTS RS232	-	-	4
CTS RS232	-	-	5
RTS 485/422+	-	-	14
RTS 485/422-	-	-	17
CTS 485/422-	-	-	18
CTS 485/422+	-	-	19

RS232 Connection

Toshiba
T2E RS232
9-Pin
D-Type, Female

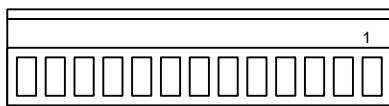


Do not connect to unlisted pins.

Recommended cable : Belden 9503, twisted multipair, screened.
Connect the screens together at the shield / Earth pin of the PLC

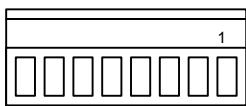
7.2. Connection details to Toshiba EX, T2E, T1XS PLC's

13-Pin Screw Terminal Block

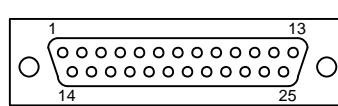


TIU100, TIU110

8-Pin Screw Terminal

TIU050, 101, 102, 103,
111, 112, 113, 201,
202, 203

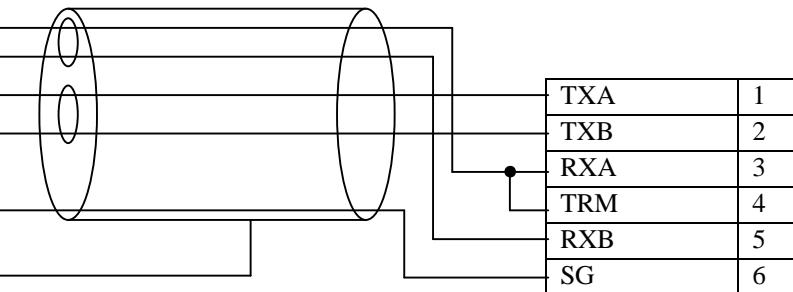
25-Pin D-Type Male

TIU300, 301, 302, 303, 304,
310, 311, 312, 313, 314,
320, 321, 322, 323, 324

TIU Type Signal Name	13-Pin	8-Pin	25-Pin
+5V	1		
TX 485/422+	2	1	12
TX 485/422-	3	2	13
RX 485/422+	4	3	24
RX 485/422-	5	4	25
TX RS232	6	5	2
Signal GND	7	6	7
RX RS232	8	7	3
Frame Gnd	13	8	1
RTS RS232	-	-	4
CTS RS232	-	-	5
RTS 485/422+	-	-	14
RTS 485/422-	-	-	17
CTS 485/422-	-	-	18
CTS 485/422+	-	-	19

RS422 Connection Twisted Shielded Pair

Toshiba
EX, T2E, T1XS
6-Pin
Screw terminal



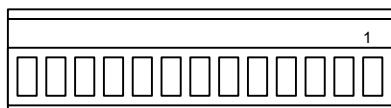
Link RXA to Term to connect
internal termination resistor at the
end of the bus.

Do not connect to unlisted pins.

Recommended cable : Belden 9503, twisted multipair, screened.
Connect the screens together at the shield / Earth pin of the PLC

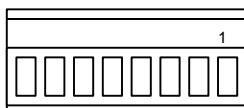
7.2. Connection details to Toshiba T2N PLC's (RS485)

13-Pin Screw Terminal Block

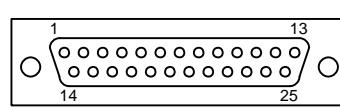


TIU100, TIU110

8-Pin Screw Terminal

TIU050, 101, 102, 103,
111, 112, 113, 201,
202, 203

25-Pin D-Type Male

TIU300, 301, 302, 303, 304,
310, 311, 312, 313, 314,
320, 321, 322, 323, 324

TIU Type Signal Name	13- Pin	8- Pin	25- Pin
+5V	1		
TX 485/422+	2	1	12
TX 485/422-	3	2	13
RX 485/422+	4	3	24
RX 485/422-	5	4	25
TX RS232	6	5	2
Signal GND	7	6	7
RX RS232	8	7	3
Frame Gnd	13	8	1
RTS RS232	-	-	4
CTS RS232	-	-	5
RTS 485/422+	-	-	14
RTS 485/422-	-	-	17
CTS 485/422-	-	-	18
CTS 485/422+	-	-	19

RS485 Connection

Twisted Shielded Pairs

Toshiba
T2N
15-Pin
D-Type, Female

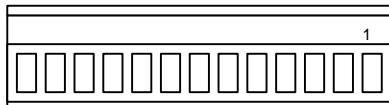
TXA	3
TXB	11
RXA	2
RXB	10
SG	7
SG	8
SG	15

Do not connect to unlisted pins.

Recommended cable : Belden 9503, twisted multipair, screened.
Connect the screens together at the shield / Earth pin of the PLC

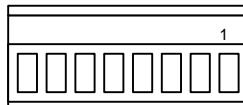
7.4. Connection details to Toshiba T2N PLC's (RS232)

13-Pin Screw Terminal Block

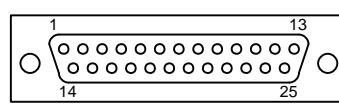


TIU100, TIU110

8-Pin Screw Terminal

TIU050, 101, 102, 103,
111, 112, 113, 201,
202, 203

25-Pin D-Type Male

TIU300, 301, 302, 303, 304,
310, 311, 312, 313, 314,
320, 321, 322, 323, 324

TIU Type Signal Name	13-Pin	8-Pin	25-Pin
+5V	1		
TX 485/422+	2	1	12
TX 485/422-	3	2	13
RX 485/422+	4	3	24
RX 485/422-	5	4	25
TX RS232	6	5	2
Signal GND	7	6	7
RX RS232	8	7	3
Frame Gnd	13	8	1
RTS RS232	-	-	4
CTS RS232	-	-	5
RTS 485/422+	-	-	14
RTS 485/422-	-	-	17
CTS 485/422-	-	-	18
CTS 485/422+	-	-	19

RS232 Connection

Twisted Shielded Pair

TX	12
TX	5
SG	7
SG	8
SG	15
RTS	6
CTS	14

Do not connect to unlisted pins.

Recommended cable : Belden 9503, twisted multipair, screened.
Connect the screens together at the shield / Earth pin of the PLC